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## *In this issue . . .*



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## All Out of Step but Aluminium ?

THE week now ending has witnessed three changes in the officially published prices of major metals. The three major United States producers have raised the price of aluminium pig by 1 c. per lb. on August 1. The new price will be 26 c. per lb. This increase will be accompanied by advances in the prices of alloy grades of pig and ingot and other products, in varying amounts, according to composition, form and degree of fabrication.

On the other hand, Baker Platinum, one of the two leading free world platinum refiners, has announced reductions in both its New York and London prices for this metal. On the same date International Nickel announced a reduction of 1 c. per lb. in the price of electrolytically-refined nickel for consumption in Canada. The latter change, however, is of purely local significance, being intended to compensate for recent changes in foreign exchange rates, and it is not expected to alter the price for the United States or any other market.

The background to Baker's decision to lower its platinum quotation is, of course, the very subdued tone which for some considerable time has characterized the market in both London and New York. In both markets trading interest has been at an extremely low ebb and free platinum prices have recently fallen below the quotations of the two leading refiners—to $84 - $87 in New York and £30 15s. - £31 5s. in London against the official rates of $92 - $95 and £34 respectively, which have remained unchanged since February, 1956. Now Baker has brought down its prices to $84 - $87 in New York and £31 in London.

While this situation might seem to imply that platinum, like other major metals, has crossed that rather nebulous dividing line which separates scarcity from temporary over-supply, it is significant that the other leading refiner, Johnson Matthey, has categorically disclaimed any intention of following Baker's lead. From this it may be inferred that Johnson Matthey are confident in the underlying stability of the platinum market and their ability to maintain their own price at the existing level.

Though demand appears to have been seasonably lower for industrial uses and increased offerings from Russian sources have been reported, available production of platinum is readily absorbed. Because of the relatively small supplies available, any appreciable upsurge in demand might well force prices higher.

There has, in fact, been no radical change in the basic pattern of supply-demand. Forward demand from the petroleum refining industry was the prime factor in prompting the directors of Rustenburg Platinum to embark recently upon a further programme of expansion, on which work has already been started. Though it is obvious that the present high rate of take-over by petroleum refineries cannot continue indefinitely, it seems likely to persist for some considerable time to come. It is also reasonable to anticipate further expansion in the demand for platinum from the chemical, electrical and instrument industries which, with petroleum refining and jewellery, constitutes the largest outlets for platinum.

The dullness currently prevailing in the platinum markets may, therefore, be attributed largely to the present tendency of metal consumers to live on their fat, due doubtless in part to lack of confidence and partly to the hope of price reductions to come. In this connection it is noteworthy that, though production in the U.S. has flattened out it remains at a record height, overall output being remarkably stable despite declines in individual industries, so that, in general, reduced purchases of materials must be reflected by lower inventories; hence, sooner rather than later, there must be a revival of demand for a number of metals, among which platinum will certainly be included.

Pricewise, aluminium is currently running counter to the trend of virtually all other major metals and alloys, apart from iron and steel. The latest price increase in the U.S. has been brought about largely as a result of a three-year wage agreement negotiated last year, whereby producers will start paying an additional 21 c. per hour to employee-members of the United Steelworkers' Union. Wage increases will add about 7 per cent to production costs, of which about 3 per cent will be absorbed by Alcoa (and doubtless by the other two major U.S. aluminium producers).

It is unfortunate that this presumably unavoidable price increase should come when, after a long period of scarcity, aluminium has at last become plentiful and producers are in a position to embark upon vigorous programmes of sales promotion.

A point which will not have escaped attention is that this 4 per cent increase in U.S. prices has further narrowed the now relatively small differential between aluminium and its traditional competitor, copper. At 26 c. the price of Alcoa pig compares with a producer's price of 29¼ c. for electrolytic copper and a custom smelters' price of 28¼ c. Clearly it's an ill wind that blows no metal producer any good! Of course, the future of copper prices in the present period of uncertainties is anybody's guess, but producers of the older metal have at least the consolation of reflecting that, for the time being at any rate, their price disadvantage has largely disappeared.

It by no means follows that Aluminium Ltd., with its fine record of price stability, will fall into line with North American producers. Its present selling price of 25 U.S. c. c.i.f. to much of Europe, if it can be maintained, should, in fact, place the Canadian company in a still more favourable position in its overseas markets, *vis-à-vis* possible competition from the United States. By taking advantage of the present opportunity for further entrenchment the company would be acting in accordance with the avowed policy of the present Canadian Government to strengthen the links of Commonwealth trade.

## ROLE OF THE ST. LAWRENCE SEAWAY

Underlying four papers on technical aspects of the St. Lawrence Seaway and power projects, presented at a symposium held recently by the Canadian Institute of Mining and Metallurgy, was an acute consciousness of the changing role of this 2,000-mile waterway in Canada's economic life, and, in particular, its immense significance to the mining industry.

The St. Lawrence Seaway Authority is providing a system of channels 27 ft. deep from Montreal Harbour to Lake Erie where, from Lake Ontario to Montreal, the governing depth is now only 14 ft. The work of the Authority was begun in 1954 and it must be completed for the opening of the navigation season in 1959.

When the idea of this imaginative project was first conceived, the Seaway was intended primarily to serve an agricultural economy. The size of the venture seemed out of all proportion to Canada's resources and the financial support and co-operation of the U.S. was deemed essential. During the 1920's, the proposed Seaway was under continual discussion and with each passing year it appeared more and more as a practical possibility and less and less as a pipe dream. At that time, however, it was still possible to envisage a seaway built largely for the purpose of hauling grain. As time went on, however, the hydro-electric resources of the St. Lawrence assumed greater importance. Earlier proponents of the project had found it no easy matter to explain a possible market for 2,200,000 h.p. The rapid growth of power consumption soon provided a convincing argument; in fact, the urgent need for hydro-electric power became an additional reason for pushing on with the Seaway project.

It was after the Second World War that the final transition from dream to reality may be said to have taken place. Canada's economy seemed to grow up round the Seaway, so to speak, and the accent changed from building the Seaway for future growth to building it for present needs. That was so in the case of hydro-electric power. It also became so when the decision was taken to develop the vast iron ore reserves along the Quebec-Labrador boundary to supply the increasing demands of the steel industry in the Great Lakes area. It became increasingly so with the flourishing growth of export and import traffic between Great Lakes and overseas ports.

Mr. Charles Gavsie, Q.C., vice-president, St. Lawrence Seaway Authority, in a paper discussing the economics of the project, attaches the utmost importance to the great diversification of future functions.

Firstly, the Seaway is to continue as a grain export route, but in greater volume than in the past.

Secondly, it is to be an iron ore route from the Gulf to the Great Lakes. Past economic development has produced a heavy concentration of steel mills on and adjacent to the south shore of Lake Erie, supplied by the vast iron ore deposits of Minnesota and Michigan. While these resources are far from petering out, the tremendous growth of the steel industry will diminish their previously dominant position. It follows that the iron ore of Quebec and Labrador will be increasingly called upon to meet the growing demand. The completion of the Seaway is the most logical step towards connecting these ore fields with their most important markets.

While traffic in other mine products will not approach the scale expected in the case of iron ore, it is reasonable to anticipate a considerable movement of these commodities, which are so well adapted for bulk carriage by water. The Seaway might be likened to a two-way street connecting the two major Canadian industrial areas and the consumer markets. On the west are the great mining areas of north-western Ontario—Algoma and Sudbury; on the east are north-eastern Quebec, the Gaspe, the North Shore, Labrador, and New Brunswick.

Thirdly, the Seaway will be a funnel into which world shipping routes will converge from many quarters. Fourthly, its power developments, including a future one at Lachine, are to be a basic power source for the adjacent territory on both sides of the boundary. This power will be readily absorbed by the expanding population and industry of Ontario.

Last, but by no means least, the Seaway will be a magnet to which future industry will be attracted, not merely in the vicinity of the canals, but throughout the whole area from the Gulf to the Great Lakes. The future developers of new mineral deposits and the future planners

of industry will be able to count on a 2,000-mile waterway from the Gulf to the western tip of Lake Superior. Doubtless the availability of this route will often serve to convert marginal or sub-marginal prospects into econimically justifiable undertakings.

Canada's increased mineral production is coming from enterprises that have started new developments on a big scale. The minimum economic size of a mining project is rising fast. Larger plants require greater flows of both incoming raw materials and outgoing products. This must result in a growing trend to water transport, particularly for bulk materials. The St. Lawrence Seaway is appearing in a mature economy, where industries have the strongest incentives to cut transport costs, and the volume of traffic is available to enable them to bring this about.

It is becoming apparent that the role of the St. Lawrence Seaway in Canada's economic future will far exceed the most optimistic hopes.

## EXPANSION OF CHILE'S COAL OUTPUT

The World Bank has made two loans totalling the equivalent of $21,800,000 to increase coal production in Chile. The loans were made to modernize and expand the mining operations of two private Chilian companies which produce about three quarters of the coal consumed in Chile.

One loan of $12,200,000 was made to the Compania Carbonifera y de Fundicion Schwager, and the other, of $9,600,000, was made to the Compania Carbonifera e Industrial de Lota. The co-borrower in each of the loans was the Corporacion de Fomento de la Produccion, the government agency responsible for promoting economic development in Chile.

Grace National Bank of New York is participating in both loans, without the World Bank's guarantee, to a total of $200,000; this represents $100,000 of the first maturities of each of the loans falling due in 1962 and 1963.

Chilean coal now accounts for about one fourth of the country's total energy supply. The Schwager and Lota companies produce about 80 per cent of all the coal mined in Chile. The modernization and expansion of their operations are essential if Chile is to continue to produce most of its own coal requirements. The projects being carried out with Bank assistance will enable the companies to increase production from the present level of 1,650,000 to 2,200,000 tons by 1964. If Chile had to import this quantity of coal, it would cost the equivalent of $40,000,000 in foreign exchange annually.

Both the Schwager and Lota companies are joint stock corporations whose ownership is widely distributed. Their mines are located on the Bay of Arauco, about 300 miles south of Valparaiso. The mine presently being worked by Schwager is nearing the end of its economic life, so it is essential that the company open a new mine area if it is to continue operations. Schwager has already spent the equivalent of $5,900,000 of its own funds on sinking a new shaft, driving new galleries and on the installation of equipment. The Bank loan will enable the company to proceed with this project. When it is completed Schwager will be able to increase production from the present level of 750,000 tons of coal annually to 1,100,000 tons in 1964. The total cost of developing and equipping the new mine during the period 1957-62 is estimated at the equivalent of $25,700,000. The Bank's loan of $12,200,000 will provide most of the foreign exchange requirements during that period and will pay for hoisting equipment, underground haulage and electrical equipment, face and rock-work equipment, and a coal preparation plant.

The Lota project consists mainly of completing the development of a new mine, the Pique Carlos Cousino, where most of the company's reserves of coal are located. Lota has already spent the equivalent of about $3,200,000 from its own resources to install new equipment and sink two new shafts. The Bank's loan of $9,600,000 will finance the foreign exchange costs of the equipment needed for the improvement and reconstruction of coal haulage installations, for the construction of a new coal preparation plant with storage and loading facilities for rock-work development. The total cost of the work to be undertaken in the period 1957-1962 is estimated at the equivalent of $15,875,000. When it is completed, the annual production of coal at the Lota mine will increase from 900,000 tons to 1,100,000 tons annually; production costs should be reduced and sales receipts increased because of the better grade of coal which the improved plant will provide and also because of less breakage of coal with new handling and haulage equipment.

Both loans are for a term of 15 years and bear interest of 5¼ per cent including the 1 per cent commission which is allocated to the Bank's Special Reserve. Amortization of the $12,200,000 Schwager loan will begin April 15, 1963, and of the $9,600,000 Lota loan on October 15, 1962. The loans are guaranteed by the Government of Chile.

## WESTERN AUSTRALIA AIDS GOLD MINING

At the recent annual meeting of the Australian Mines and Metals Association the need was stressed for increased assistance to Australian gold mining under the Gold Mining Industry Assistance Act. On this matter, requests have been made to the Federal Government by the several Chambers of Mines, a fact that was noticed in our issue of July 12, 1957.

In keeping with other State Governments, the Western Australian Government is assisting mining in several ways. One of these, according to our correspondent in Australia, is by diamond drilling. This work has been undertaken recently on mining leases which are considered by the technical officers of the Department of Mines to have some chance of success, and where leaseholders are prepared to contribute on a £1 for £1 basis. Drilling has also been done on Crown Lands which warrant exploration.

If a leaseholder is willing to incur half the cost of drilling the work will be carried out by the Department, and in the event of the work locating payable ore deposits, the Department expects the leaseholder to refund its share of the outlay by payments equivalent to 10 per cent of the gold subsequently produced. This scheme has been in operation at Bonnievale, a locality north of Coolgardie, which was productive in the early years of mining.

The first hole drilled to explore for downward repetition of the shoots previously worked, reached a depth of 1,800 ft. but did not disclose any favourable indication. Operations have now been transferred to Kanowna, north-east of Kalgoorlie and drilling has been commenced on the old White Feather Main Reef, which produced 85,334 oz. of gold between 1897 and 1906. Vertical repetition is to be tested in three other old mines at Kanowna.

The Department's policy in this direction is to be commended, and could have a marked influence in fostering renewed interest in gold mining.

# Building a Reef Wall in


Stoping width at Hartebeestfontein

Building a reef wall

IN stoping practice carried out at Hartebeestfontein Gold Mining Company, South Africa, newly blasted rock is stacked some 6 ft. away from the face as a reef wall to confine the effects of the next round blasted to a smaller area. The sequence of reef wall construction is shown in the accompanying photographs, the stope in question being 27 in. in width.

After the blast, fine material finds its way below the bigger pieces of reef and waste rock, the reef wall being built with the larger fragments. Besides confining the effects of subsequent blasts, the wall ensures that fine particles of gold-bearing reef are not distributed over a large area by successive blasting activities.

As stoping operations advance, the reef wall is broken down and the reef separated from the waste rock. This waste is packed into a waste wall while reef of all sizes is thrown into the gulley for lashing into a haulage car.

The variations in rock size from a normal blast are revealed in the photograph *at top left of this page*, representing a half-ton of rock blasted from the face and sorted according to size. It will also be noted in the photograph *at bottom right* that the back of the haulage car is roughly horizontal, indicating the dip of the reef. In this picture a native miner at the face lashes reef into the stope car, shown at the advancing face end of the stope track gulley.

The equipment used in building a wall is : ¼ in. hose for washing fines off larger pieces of rock, a pinch bar, a shovel, a 4-lb. hammer, two measuring bars, a bow saw, and a timber sprag.

Sorting reef from waste rock

Lashing reef into stope car

# South Africa

**Joining of stope track and scraper gulley**

It will be seen from the illustration *below*, that on the worker's left-hand side is the waste wall into which waste rock is packed to avoid transportation to surface and also to provide support for the hanging wall. The tools listed are seen in front of the worker.

In the operation, the stope tracks are linked up with the scraper gulley and the reef is removed down the dip by means of a mechanical scraper.

The illustration published *above* shows the stope track as it joins the scraper gulley into which ore from the cars is tipped. The stope runs to right and left. Wooden mat packs filled around with waste rock as hanging wall support can be seen on both sides. The 3 ft. ruler is at the left of the stope entrance. A plumb-bob hanging from an overhead pipe shows the dip of the scraper gulley and also the dip of the reef to be between 8 deg. and 10 deg.

**Sweeping the footwall fines**

URANIUM recently has been produced in Western Germany. Uranium ore is being mined in Weissenstadt, a small town in the Fichtelgebirge, where Eisenwerk-Gesellschaft Maximilianshuette A.G. set up Gewerkschaft Werra, an experimental plant. Exploration by Maximilianshuette under licence from the Bavarian Government, had resulted at the end of last year in discoveries of some 80,000 to 100,000 tons of uranium-bearing ore. The ore consists of copper, phosphate and uranium. It is of medium quality, according to *Mineral Trade Notes* Vol. 44, No. 1, published by the U.S. Bureau of Mines.

## Bavaria's

In co-operation with two other companies, Maximilianshuette succeeded in increasing the purity of the uranium salt from 40 per cent to 98 per cent, and it is estimated that the company's Weissenstadt plant will be able to ship 10 tons of uranium 238, containing 0.7 per cent of uranium 235, per annum by the second half of 1958.

The two other companies assisting Maximilianshuette in the production of uranium are Chemische Fabrik von Heyden, Regensburg, which processes the ore, and Deutsche Gold-und Silberscheideanstalt (Degussa), Frankfurt am Main, which does the smelting.

## Nuclear

Exploration for uranium ore in Bavaria will be continued. Bayerische Braunkohlenindustrie A.G., Schwandorf, has been given a second governmental licence for exploration in the area of Schwandorf. This concern has reached agreement with Maximilianshuette under which the companies will co-operate.

Bavaria has additional assets in the field of atomic research in the possession of the most important graphite reserves in Germany. These reserves are exploited by Graphitwerk Kropfmuehl A.G.., Kropfmuehl. The search for additional reserves is continuing. It is believed that the Kropfmuehl graphite's natural purity grade of 46 per cent could be increased to 100 per cent, enabling the material to be used in atomic reactors.

## Materials

Construction of the first West German atomic reactor will be started in the near future at Garching, a small Bavarian settlement on the Isar river about 20 kilometers north of Munich. On this site will be erected a small swimming pool reactor, to be built within one year, laboratories and scientific institutes, and a large experimental atomic reactor to be built in about four years. The small research reactor was ordered in June, 1956, from the American Machine and Foundry Co., New York.

The reactor will have a capacity of 1,000 to 2,000 kW. and will be used for research and training purposes.

Plans are being made to erect in Bavaria the first German experimental atomic power plant. The Rheinisch-West-faelische Elektrizitaetswerk, Essen, is planning to construct a 10,000 kW. plant in Dettingen/Main. Most of the construction work will be done by Siemens-Schuckert A.G. of Erlangen. Total costs are estimated at DM.20,000,000 to DM.30,000,000.

# Studies on

ALTHOUGH explosion studies had been conducted in surface galleries in England and other European countries before the experimental coal mine was opened in 1910, this mine provided the first underground testing laboratory in which carefully controlled, large-scale tests could be made under conditions simulating actual mining practices. The mine is at Bruceton in Allegheny County, Pa., about 13 miles southwest of Pittsburgh. It is developed by drift openings, 9 to 10 ft. wide and 6 to 7 ft. high, in the Pittsburgh bituminous-coal bed, which in this vicinity is essentially level, is 62 to 64 in. thick, and outcrops along the hillsides.

The original objective of the experimental coal mine was to serve as a place for testing the explosibility of coal dust and gases. It has, however, also been the scene of research on many other problems designed to promote safety in mining. These concern studies of mine- and vehicular-tunnel ventilation, mine-fire extinguishment, roof control, strength of mine stoppings, allaying of dust on roadways, compressibility of coal, helium storage, mine lighting, mine rescue training, and various investigations of explosives. To date about 2,500 explosion tests have been made in the mine.

## Recent and Current Research

To determine what hazards exist in short-delay blasting and to compare these with single and with simultaneous multiple blasting, 264 large-scale tests were made in the experimental coal mine. Attention was given to the ignition hazards of gas and coal dust, effects on mine roof, quantity and breakage of coal produced, amount of float dust formed, relative time requirements for blasting, and the problem of misfires. The studies suggest that short-delay multiple blasting in coal with permissible explosives can be accomplished as safely as single-shot blasting when the operation is carried out as recommended by the Bureau of Mines. However, this does not constitute official sanction of the practice by the Bureau.

Research was carried out to study the conditions under which coal dust can be ignited by permissible explosives and to determine how such ignitions can be prevented in coal mines. It was found that permissible explosives fired in short holes in coal according to the procedure recommended by the Bureau of Mines will not ignite coal-dust layers or coal-dust clouds in air. The principal recommendations specify a limited charge weight per shot hole; undercutting and other relief of the coal face; a minimum depth of coal burden surrounding the shot hole; and provision of adequate incombustible stemming or an approved stemming device in the shot hole.

Tests were made in the experimental coal mine to determine the potential explosion hazards due to the presence of cuttings and to investigate whether any practical measures can be taken to lessen the hazard. The study showed that the presence of coal cuttings underground may well enhance the propagation of coal-mine explosions. The hazard can be reduced by eliminating irregularities in the stored material and by levelling the surface to provide the smallest area on which the forces of an explosion can act. The surface should then be covered with a thick layer (preferably 1 in. or more) of limestone, or if desired it can be consolidated into a firm covering. In addition, coal dust on the rib and roof surfaces must be neutralized by generalized rock dusting.

Investigation following a recent widespread explosion disclosed that the presence of several trips of mine cars may have contributed to the propagation of flame. The cars had been loaded (topped) on the previous day with friable coal produced at the mine to a height of 10 in. above the level of the car frame and were left standing in the entry. The coal contains about 20 per cent of particles smaller than ¼ in. and an appreciable quantity of fine dust capable of supporting an explosion.

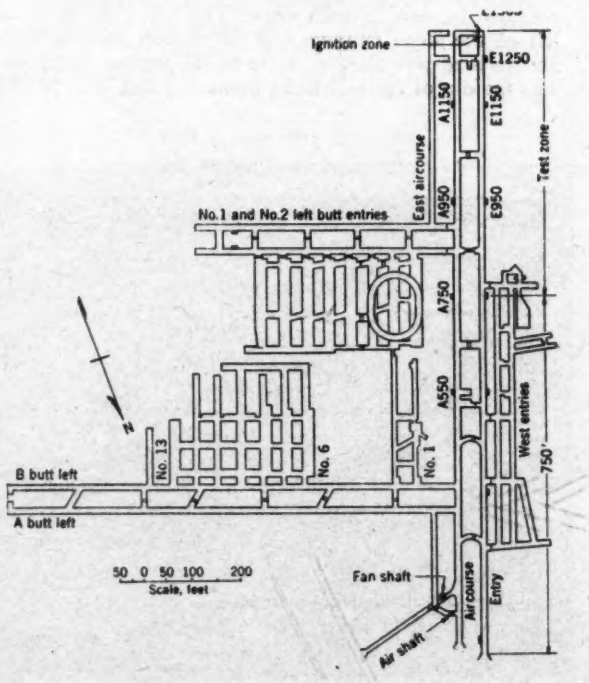
Since this manner of loading cars and scheduling their haulage is standard practice in many mines, about 20 explosion tests were performed in the experimental coal mine to study the problem. The investigation has shown that mine cars filled with coal cuttings or similar fine coal produced by continuous mining operations, when parked in the mine entry in the path of an explosion, may, under some conditions, greatly increase the length of flame travel, even though the entries are properly rock-dusted. The principal effect appears to be due to combustion of fine coal particles that are eroded from the tops of the cars by the pressure wave preceding the explosion flame.

## Need for Safeguards

The experiments indicate the need for safeguards, in addition to adequate generalized rock dusting of the entries. Possible safeguards include: Light overhead cross shelves with rock dust in the area and for a short distance inby and outby the area where the loaded cars are parked; loading the top part of cars that contain coal cuttings and other fine coal, with coarse run-of-mine coal; and providing an incombustible covering over the cars that are loaded and topped with fine coal.

More than 20 explosion tests were made in which two, four or six heaped deposits (generally 300 lb. each) of coal dust or coal cuttings in the form of prismoids, with a base

**Plan of experimental coal mine**



# Coal Dust Explosions in Mines



of 4½ by 3½ ft. and a height of 2 ft., were placed slightly off the centre-line of the entry. The deposits were generally spaced equally within a 100-ft. zone. The explosions were initiated by one of four types of sources; these included a gas-air mixture and blown-out shots fired into pure coal-dust zones of various lengths. Outby the ignition zone the entry contained mixtures of coal dust and limestone with enough incombustible to prevent propagation of an explosion, neglecting the additional heaped deposits of coal.

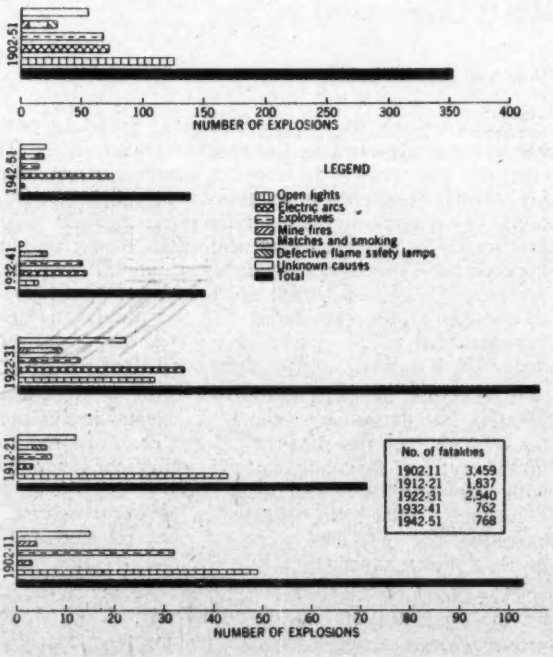
**The results of recent and current studies at the experimental coal mine of the U.S. Bureau of Mines were summarized in a paper delivered by Irving Hartmann, chief of the Dust Explosions Branch of the Bureau, at the Second Annual Symposium of Mining Research at the Missouri School of Mines and Metallurgy and the Federal Bureau of Mines in late 1956. The paper, here condensed, has been published as Bureau of Mines' *Information Circular 7785.***

## Dangers of Dust and Cuttings

The experiments showed that the presence of the heaped (excessive) deposits of coal dust or cuttings enhanced the travel of flame, in some instances by as much as 350 ft. The explosions with deposits of fine coal were more severe than those with cuttings. The closer the deposits were to the igniting source the greater was the flame extension; length of flame was not increased appreciably when the deposits were placed in the outer end of the zone where the flame normally stopped. To study the alleviation of the hazard of excessive dust deposits, in several tests the top of the coal dust was covered with a 1-in. layer of limestone dust. This was effective in reducing the added hazard of the piles of coal dust.

A limited number of tests were made in the experimental mine to evaluate the effect of water infusion on dust produced during mining in the Pittsburgh coal seam. Water was forced into boreholes 6 to 20 ft. in depth, at pressures ranging from 18 to 100 p.s.i. Samples of airborne dust were collected with a midget impinger during undercutting, drilling, blasting, and loading in 12-ft. wide rooms. The results showed wide variations in the amount of dust produced in repetitive tests under identical conditions, which masked the effect, if any, of water infusion. Although no precise conclusions could be drawn from the test results, it is apparent that infusing water into the Pittsburgh coal seam has little if any beneficial effect on reduction of dust.

**Causes of major U.S. colliery explosions, 1902-51**




## Study on Dust Sampling

Investigation on intensive dust-sampling was based chiefly on a comprehensive dust-sampling survey in a commercial coal mine. Its purpose was to obtain some much-needed information on the adequacy of current rock-dusting and dust-sampling practices in coal mines. More immediate aims of the work were to determine the variations of incombustible content in mine dust on the floor and on rib-roof surfaces along mine entries, secondary entries, and rooms; to compare spot or grab samples with concurrent strip samples; to determine the amount and fineness of dust in entries; to examine the nature of the solid incombustible in mine dusts; and to check underground the usefulness of a rapid, approximate colour-sorting procedure for separating dusts of high and low incombustible content. On the basis of the study in this mine it was concluded that: Band or perimeter sampling of dust can be substituted with no sacrifice in safety, for the more time-consuming road and rib-roof sampling; the incombustible in the top 1-in. layer of dust on roadways gives a good estimate of the incombustible in the full-depth dust deposits; the incombustible in many mine dusts contains large portions of sand, shale, or other coarse material much less effective in stopping explosions than normal, finely divided limestone dust. Since conclusion of this investigation it has been found, as already indicated, that in many coal mines rock dust is spread on the floor, but little or no rock dust is applied to the ribs and roof and vice versa.

The practice in some mines is to apply an abundant "blanket" rock-dust layer on the floor of entries and neglect rock-dust application on rib and roof surfaces. This is done partly because it is easier to spread rock dust on the floor than on overhead surfaces and partly because of the belief of some that excess rock dust on the floor

will compensate for deficiency of rock dust overhead. A limited investigation was made in the experimental coal mine to test this theory. The experiments showed that blanket rock-dusting of the floor is not effective in stopping explosions.

To protect trackless entries and other areas where it is difficult to maintain generalized rock dusting, bag-type rock-dust devices have been used in a few coal mines. Advantages claimed for these devices include the following: They afford good supplementary protection in back entries; they provide added protection against fresh deposits of coal dust; they can be installed easily and quickly on shift, with little discomfort in breathing; they make rock dust readily available for fire fighting; the rock dust does not become wet from contact with moisture on mine surfaces; the rock dust is not covered by spalled roof rocks as readily as is generalized rock dusting; and the bag-type installations can easily follow rapid advance of the coal face.

Tests with various modifications of these devices showed that one of their drawbacks was inadequate dispersion of the rock dust into the air stream at the proper moment. To overcome this a burster, consisting of a charge of permissible explosive, was incorporated in the bag-type units. In a few tests the explosive charges were triggered by a manually-timed switch; in others a pressure-sensitive or a flame-sensitive device was operated by the explosion itself. The tests indicated that a properly designed system of bag-type units, equipped with bursters for dispersing the dust, was capable of arresting coal-dust explosions.

### Wet Rock Dusting

Recently, an extensive investigation was carried out in the experimental coal mine to determine the applicability and limitations of wet rock dusting and to evaluate its effectiveness in preventing propagation of large coal-dust explosions. The tests showed that protection against explosions near rapidly advancing coal faces can be achieved without undue difficulties by applying wet rock dust on rib and roof surfaces and by applying dry rock dust on the floor of mine entries to neutralize the coal dust thereon.

The effectiveness of numerous types of rock-dust barriers and of several types of water barriers for stopping experimental coal-dust explosions has been studied in the experimental mine for many years. The most recent study was made in connection with the protection of rapidly advancing coal faces in mechanized mining. In one series of tests the rock dust was placed on light, transverse shelves 4 ft. long and 10 in. wide. These were suspended a short distance below the roof and set 5 ft. apart in two staggered rows along either side of the centre line of the entry. Each board held 10 lb. of limestone. The suspension wires were readily broken by the pressure wave that preceded the explosions, and the contents of the boards were dispersed into the air.

Water-filled troughs were used to control the explosion in a few other tests. The troughs were made of 8-in.-wide boards, 4 ft. long, set 10 ft. apart in two staggered rows along the entry. There were 30 troughs in the test zone; each held 10.5 gals. of water. They were supported below the roof on ½-in. round iron shafts. To control the rate of water discharge, the top of every other trough was partly covered to provide a ½-in.-wide slot at each end. Uncovered troughs discharged the water in 1 sec. and partly-covered troughs in about 3 to 4 secs.

The investigation showed that the light, transverse rock-dust shelves and the water troughs installed near the source of the explosions were highly successful in arresting flame propagation.

# From Ceramics to Mining Machinery

STAGE one of a filtration plant for the French coalfields was recently completed by William Boulton Ltd., of Burslem, Stoke-on-Trent. This plant will have a total filter press capacity of 100 tons, the holding capacity of each individual press being 15 tons.

Established over 100 years ago, William Boulton are today the largest ceramic engineers in the British Commonwealth. Many of the machines first developed by the late William Boulton himself are still marketed throughout the word. In recent years the company has entered the process engineering field and is supplying a wide range of special machines to meet the modern demand for higher temperature and finer quality materials. Facilities are available for carrying out exhaustive trials in order to produce machinery specifically designed to implement a process or operation required by the customer.

### Range of Presses

The Boulton range of filter presses extends from 8 lb. to 20 tons capacity. A feature of the company's standard filter press is the patent overhead tray moving gear, which enables presses to 36 in. square to be worked by a single operator. The company is ready to prepare schemes and conduct tests on all filtration problems.

Among Boulton's most recent developments is a screen using controlled gyratory motion in horizontal and vertical planes, in sizes up to 44 in. dia. of lawn area. It is claimed that the circular gyratory type of motion exposes each particle to 15 per cent screen apertures per cycle more than ordinary reciprocating motion, and 45 per cent for the combined reciprocating gyratory motion. Three screen decks can be fitted, giving four separations, and this flexibility of screen combination enables a wide range of duties to be undertaken. No skilled labour is necessary to maintain, dismantle or assemble the screen, which is supplied as a complete operating unit.

### Wet and Dry Grinding

Complete plants for wet or dry grinding are made, installed and commissioned by the Boulton organization. The company has recently developed a continuous wet grinding system, which will grind to extremely tight specifications. A typical installation reduces all material 90 per cent minus 15 microns, 10 per cent minus 10 microns, and the classifying system works with an overall efficiency of 92 per cent. Other installations which have been put to work in the past 12 months reduce all the product minus 4 microns. Up to the present this system has been introduced on flint, clay, barytes, felspar and stone.

A 50 ft. dia. thickener to deal with material from a wet grinding installation was recently completed; it had to be designed so that the thickened slurry could be removed up the centre of the main shaft. This thickener is equipped with automatic lifting gear to give a 1 ft. 6in. lift on the rakes and is fitted with bell and visual alarm in case of excessive loading. This plant has been installed and is giving complete satisfaction.

The company made ball and pebble mills for the original patentee of modern mills, Mr. J. R. Alsing, seventy years ago, and it has been making them ever since.

# MINING MISCELLANY

Deposits of flint clay in the Negev have been found to possess a very high aluminium content and to be practically free of iron.

★

Figures issued recently by the Mining Research and Exploitation Administration show a substantial increase in mineral output in Turkey since the adoption of the Law (6309) for the Encouragement of Exploitation of Mineral Resources. The number of permits for drilling, research and exploitation of minerals rose from 118 in 1946 to 1,298 in 1955 and to 1,655 in 1956.

★

In Azad Kashmir, prospecting of coal deposits has been started in the Mirpur district. The deposits have been leased by the Azad Kashmir Government to a mining firm, which has started prospecting operations. A team from the Pakistan Geological Department, now in Azad Kashmir, is studying the possibility of mining bauxite.

★

A collection of about 50 specimens of minerals from Northern Rhodesian mines has been received at Ryhope Grammar School, Sunderland, in the U.K. They are the gift of Mr. W. G. Dunlop, the Member for Mines and Works in the Northern Rhodesia Government, and are for the use of the school's chemistry students.

★

If final analysis of the iron proves satisfactory, Nyasaland may have an iron ore mine in production early next year. The ore will be for supply of the projected cement factory at Changalumi, eight miles south-west of Zomba, and also for export to Rhodesia. The deposits are situated about three miles from the main railway line near Lirangwe and were discovered about a year ago by Mr. M. F. Garson, of the Geological Survey Department. They are to be worked by a Rhodesian syndicate, which will aim at a production of 10,000 tons a month of raw ore from about March next year. Samples have already been taken.

★

The section of France's Third Modernization Plan relating to iron ore is reported to envisage raising production to 70,000,000 tons a year by 1961. This increase is to be achieved with little or no change in manpower. Investments would total 45 milliard francs, and it is hoped to raise productivity by 7 per cent each year.

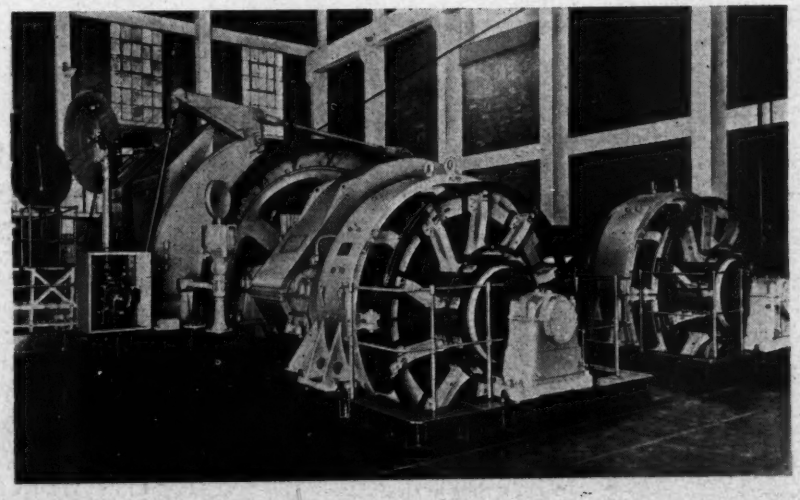
★

The mining industry of the Dominican Republic has substantially increased its output over the last five years. In 1951, a total of 144,000 tons of minerals were exported to a value of £537,000, compared with the 1956 figure of 280,000 tons valued at £1,250,000. The chief minerals exported were gypsum, salt, granite, marble, and iron. The exploitation of bauxite deposits by Alcoa is progressing satisfactorily. Recent mining laws passed by the Dominican Congress are expected to attract more foreign capital.

★

The Vanadium Corporation of America has completed exploration and drilling arrangements with United Western Minerals Co., J. H. Whitney and Co., White, Wild and Co., and San Jacinto Petroleum Corporation, whereby Vanadium will conduct both underground exploration and drilling for the purpose of developing carnotite (vanadium-uranium) ore in New Mexico. Subject to satisfactory tests, a shaft will be sunk to the known ore in the Morrison formation in the Ambrosia Lake District, McKinley County, with a view to subsequent exploration by diamond drilling of the deeper sands in the Westwater formation.

**This 4,700-h.p. Metropolitan-Vickers electric winder with twin d.c. Ward-Leonard drive is installed at the main shaft of the West Driefontein Gold Mining Co. Ltd., South Africa. It is one of eight similar equipments supplied by M-V to the New Consolidated Goldfields Group and is one of the largest Ward-Leonard winders in South Africa**



A five-cent mining stamp will be issued by the Post Office Department of Canada on September 5 this year to emphasize the significance of mining in the Dominion's economy. The stamp, which is here illustrated, will be printed black and will illustrate a miner working underground with a pneumatic drill. Its introduction antedates the start of the Sixth Commonwealth Mining and Metallurgical Congress at Vancouver on September 8. The stamp was designed by A. J. Casson, R.C.A., after a photograph by the well-known mining photographer, George Hunter.


## PERSONAL

Mr. S. E. Morgan, Mr. H. Rose and Mr. D. S. Cohen have joined the board of Rosterman Gold Mines Ltd.

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Mr. Ian L. Patterson has been appointed a director of Clutha River Gold Dredging, Ltd. Mr. T. P. Patterson has resigned from the board.

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Mr. S. E. Clotworthy, managing director of Northern Aluminium Co. Ltd., has succeeded Mr. W. Fraser Bruce as the representative of that company on the Council of the Aluminium Development Association. Mr. B. L. Page (a director of John Dale Ltd.) has succeeded Mr. J. F. Paige (managing director, until his recent retirement, of William Mills Ltd.) as representative on the Council of the aluminium founders' organization, L.M.F.A. Development Ltd. The Council has appointed to the executive committee Mr. R. T. Raven as representative of Birmid Industries Ltd., in place of Mr. Harold Goodwin who has retired; and Mr. Desmond James (T. I. Aluminium Ltd.) in place of Mr. W. H. Bowman.

★

Mr. P. W. Howard, managing director of the British Tyre and Rubber Co., Ltd., and chairman of the Research Association of British Rubber Manufacturers, has been elected president of the association in succession to Lord Baillieu, chairman of the Dunlop Rubber Co. Mr. D. B. Collett, Dunlop director, succeeds Mr. Howard as the association's chairman.

## AGENCY WANTED

Macchine Attrezzi Edili e Stradali, Via Rosolino Pilo 15, Palermo (Sicily), are interested in representing in Sicily a U.K. firm manufacturing diesel- and electric-driven air compressors with the relevant pneumatic tools. They wish to contact a firm not represented in Italy. Manufacturers interested should write direct to the Palermo company, notifying the British Consulate, Via Caltanisetta 1, Palermo, that they have done so. B.O.T. Ref.: E.S.B. 15789/57. Telephone enquiries to Chancery 4411, extension 776 or 866.

*Technical Briefs*

# Lead Shielding in Mass-produced Nuclear Reactors

The 17 mass-produced nuclear reactors for which Aerojet-General Nucleonics recently announced it has received construction permits from the A.E.C., should require nearly 65 tons of lead radiation shielding, according to Mr. R. L. Ziegfeld, secretary of the Lead Industries Association in the United States. Thus lead contributes in a major way to the safety of these reactors, which are said by the manufacturer to be the only operating reactors adjudged by the A.E.C. to be safe enough for installation in existing buildings in heavily populated areas.

The use of lead minimizes the thickness and weight of the gamma-ray shield, which is only 4 in. thick and weighs less than 4 tons per unit. The lead shield thus is less than one-fifth as thick and weighs 1,200 lb. less than the water shield employed in the same reactor to stop neutrons, according to Mr. Ziegfeld. Easy fabrication of lead also contributes to the practicability of mass production.

## MINERAL-EXPLORATION AID

A rapid, accurate and easy-to-use method, designed by metallurgists of the U.S. Bureau of Mines for determining the heavy-mineral content of beach sands and concentrates produced in mineral-processing plants, is described in a technical report released by the Department of the Interior.

Valuable heavy minerals such as cassiterite, rutile, ilmenite, and zircon are obtainable from beach and dune sands scattered over the earth. However, because these minerals were deposited unevenly by wind and water, richly endowed areas can be located only by extensive core drilling.

To aid engineers and prospectors exploring for heavy mineral deposits, metallurgists at the Bureau's Southern Experiment Station, at Tuscaloosa, Alabama, devised an inexpensive method by which core samples can be evaluated readily in the field, thus permitting an engineer to plan his drilling programme without waiting for results of time-consuming laboratory analyses.

The Bureau process, which can be used by a non-technical person, employs acetylene tetrabromide, which causes lighter minerals to float and permits the heavier ones to sink. Precise recovery of the heavier minerals can be accomplished by a series of simple steps involving inexpensive funnels, pans, and oil-sediment centrifuge tubes. Other equipment includes a set of balances or scales, and heating equipment, such as a camp stove. The acetylene tetrabromide employed in the process can be salvaged and re-used time and again. This chemical is toxic and should be used only in well-ventilated places.

A modified technique permits operators of mills to evaluate the performance of their equipment frequently and thus maintain constant control over the quality of the concentrate obtained.

## FATIGUE LIMIT ON PLATING

It has been concluded that the intrinsic fatigue limit of conventional chromium deposits is 20-25 tons per sq. in. for heat-treated coatings and about 28 tons per sq. in. for as-plated deposits. It therefore appeared probable that with relatively strong steels fatigue failure is initiated in the chromium deposit and that the fatigue limit of the plated component is thus limited by the intrinsic fatigue strength of the chromium.

In contrast to the behaviour of medium- and high-tensile steels, the fatigue limit of low strength materials might be increased by chromium plating. Current work has tested the validity of this assumption and has checked the accuracy of the previous conclusions by using steels of different composition and having wider tensile-strength ranges. The basis materials used varied from Armco iron (carbon, 0.02 per cent) to steels containing 0.5 per cent of carbon, and an 18-8 chromium-nickel steel.

The results of the tests, considered in conjunction with other published information, indicate certain fairly clear-cut relations between the fatigue strength of unplated and plated steel. The main conclusions drawn are given below.

When a steel is chromium plated there is a linear relationship between the percentage change in fatigue strength and the fatigue limit of the steel. Arising from this relationship, it is possible, in unbaked deposits of a known level of internal stress, to predict the percentage change in fatigue strength resulting from chromium plating, provided that the fatigue limit, the tensile strength, or the D.P.H. value of the steel is known. This deduction is possible, irrespective of the composition of the steel. A formula is derived for such calculation.

For very soft steels the fatigue strength may be increased by chromium plating, and there is evidence that failure is initiated in the steel at the steel-plating interface. For conventional chromium plating having an internal stress of the order of 4 tons per sq. in. this condition applies for steel having, unplated, a fatigue limit of 18 tons per sq. in. or less. For steels of a strength above that level the chromium plating first fails when the applied stress plus the internal stress reaches the inherent fatigue limit of the chromium (20-22 tons per sq. in.). Propagation of the crack in the chromium, into the steel, and consequent failure of the component, appear to occur only when the stress concentration at the root of the crack approaches the fatigue limit of the substrate.

Investigations on the influence of nickel plating were made on coatings electrodeposited from two dull and three bright solutions. The results of these experiments, together with other data previously available, are considered to offer definite evidence that the general effects which have been observed for chromium coatings may apply also to nickel plating. It is believed that, for certain types of nickel deposit, the linear relationship between the percentage change of fatigue limit and the fatigue limit of the steel base is valid. As in the case of chromium, there appears to be a linear relation between the internal stress present in the nickel deposit and the percentage change in fatigue strength of the plated composite. In contrast to unbaked chromium deposits, the percentage loss of fatigue strength increases with the thickness of some nickel coatings.

## DETERMINATION OF ELEMENTS

A new, simplified technique for overcoming one of the laboratory chemist's chief time-consuming problems, that of spectrochemical determination of the elements in samples of unknown origin and basic composition, has been developed at U.S. Steel's new Research Centre in the United States. Known as the "carbon-matrix technique", the new method utilizes a graphite electrode to create the necessary dilution and a known, small amount of germanium to produce a reference intensity in the spectrum.

In making any spectrochemical analysis, it is necessary that the instruments be calibrated with materials of the same basic composition, or matrix, as the samples to be analyzed.

When these samples are of an unknown basic composition, it is difficult to determine the concentration of the various elements present. This is because there is a characteristic wavelength for each element and its concentration is measured by the intensity of light of that wavelength emitted when the sample is excited in an electrical discharge. The light intensity, however, changes with the matrix of the sample, and calibrations prepared for one material may not be applicable to another. Thus, when the matrix is unknown, the spectrochemical method cannot be applied, since the calibration which should be used for the analysis cannot be determined.

The usual way to overcome this difficulty is to mix the sample with some standard substance for which calibrations can be prepared. A procedure involving dilution of up to 800 times the unknown sample with varying amounts of germanium dioxide and then by a mixture of equal amounts of graphite and copper oxide in the ratio of one to 40 has given satisfactory results. By using copper as the internal standard and analyzing in triplicate with a series of standards, an over-all accuracy of plus or minus 10 per cent is achieved.

The carbon-matrix technique developed by scientists at the Research Centre is, in effect, a simplified method of diluting the sample with a standard substance. A tiny amount of the sample is placed in a small crater which is drilled into the end of a graphite electrode. When the electrode plus the sample is placed in the electrical discharge, the necessary dilution with a standard substance is performed by the carbon of the electrode.

*Metals and Minerals*

# New Uses For Aluminium

While it is evident that aluminium's competitive position in the United States market has not been improved by the latest price increases, the outlook for producers still remains highly encouraging, having regard to the rapid progress now being achieved in the development of new uses and the expansion of existing outlets.

After a long and uphill struggle, the aluminium industry believes that it has finally won back a very big customer—the U.S. motor car manufacturers. It is not generally realized that early in the century American cars used aluminium more extensively than today. Ford's ancient Model T's had aluminium hoods and the 1925 Pierce-Arrow was practically an aluminium car. However, cheaper, easier ways of fabricating steel were developed in the 1920's and aluminium lost ground.

Now the trend is again in favour of the light metal. The use of aluminium in American cars has risen 250 per cent in three years. This year an average of 40 lb. is being used in each car for such items as pistons, transmission housings, and grilles. Cars with power steering and power brakes average an additional 12 or 13 lb., and Cadillac's new $13,500 Eldorado Brougham uses more than 255 lb. U.S. motor car manufacturers have recently been switching to an increasing extent from chromeplate to aluminium for trim use, and this field is regarded as the richest for exploitation in the near future. The opinion was recently expressed that before many years it will be possible and practical for the average American car to use as much as 300 lb. of aluminium.

Road construction is apt to be thought of primarily in terms of steel and cement, but it also provides a large and rapidly expanding outlet for aluminium, both directly and indirectly. Experts in the aluminium industry estimate that, under the projected road construction programme, the U.S. will consume more than 500,000 tons of aluminium by 1965. This tonnage—equivalent to about a third of a year's production under present U.S. capacity—will go into lighting standards, bridge railings, chain link fences, directional signs, and other accessories. Some bridges will be constructed of aluminium.

On June 24, for the first time in Texas newspaper history, aluminium foil in addition to newsprint rolled through the presses. Almost 100 miles of Alcoa Wrap aluminium foil formed a separate page of metal in over 210,000 copies of the *Houston Chronicle*. Each sheet of foil could be removed from the paper for use by the subscriber. Opposite the page of foil was a two-colour advertisement by Alcoa, announcing a free sample of Alcoa Wrap made from aluminium produced in Texas. Producers and retailers, in the Houston area, of foods wrapped in aluminium foil were offered an opportunity of tying-in with special advertising. Alcoa also arranged for style shows to be given at leading markets to display aluminium dresses and bathing suits. This unusual newspaper advertising technique produced a startling effect on sales in the Milwaukee market, where Alcoa first tried it out. It is an illuminating example of the vigour and effectiveness of the current aluminium drive.

Equally noteworthy, in its entirely different way, is the news that Alcoa is putting on the market new aluminium powder metallurgy products which, the company claims, mark a major breakthrough the heat barrier that has previously barred the use of aluminium in numerous high-temperature applications.

A further announcement by Alcoa claims that this company has become the first U.S. producer to guarantee its pig aluminium to be no less than 99.5 per cent pure. Since the end of 1942, when aluminium pig was first advertised, pig purity has been listed as 99 per cent minimum average. Technological advances in the aluminium smelting process now permit Alcoa to advertise metal of 99.5 per cent minimum purity without regard to averages and to market the improved grade without extra charge. The availability of higher grade pig should enhance the attractions of aluminium in a wide range of applications where materials are very rigidly controlled.

The U.S. aluminium industry's continued confidence in the future outlook is reflected in the continuation of current expansion programmes, states the Aluminium Association. Particularly significant is the fact that the industry is not only going ahead at a steady pace with construction of facilities already started, most of which will be completed next year, but is already looking ahead to 1960 and later with firm plans for a minimum of 200,000 tons of capacity above that now under construction.

The market for aluminium is believed to be wide open with the saturation point far from sight. Cold reason, it is stated, dictates that the industry must have adequate capacity to guarantee unbroken delivery of metal in quantity before it can go after new business on an extensive scale.

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Mr. Franklin G. Floete, head of the General Services Administration (GSA), told a Congressional committee this week that his agency might have to spend approximately $340,000,000 to buy an additional 682,909 s.tons of aluminium from U.S. producers. He was testifying before the joint Senate-House of Representatives Committee on Defence Production, explaining contracts entered into by G.S.A. during the Korean war, when the U.S. sought to expand its aluminium output and guaranteed to purchase at market prices any surplus metal produced.

## UGANDA WOLFRAM CONTRACT

In reply to a question in Parliament regarding the renewal of the contract for the bulk purchase of wolfram from Uganda, it was stated on behalf of the Colonial Secretary that the British Government regretted it could not see its way to renew this agreement. The situation, it was pointed out, had changed radically since the end of 1952, when the contract was placed.

## NICKEL PRICES

The latest bulletin of the National Association of Purchasing Agents indicates that a gradual rise in nickel prices may be expected in the future and that present prices are probably in the valley. Mr. Harold A. Berry, chairman of the N.A.P.A. nickel survey committee, has stated that demand greatly exceeds supply and will continue to do so for at least three more years, when expansion plans for nickel production begins to bear fruit.

Though prices for primary nickel on the open market, at home and abroad, and for nickel-content scrap have recently been trending downward, much of this easing off in price is attributed to a reduction in demand, caused by failure of the appliance and motor car industries to meet production forecasts and by a general tendency to inventory reduction. It is now felt that the bottom has been reached in pricing.

## TITANIUM DATA

Because of the increasing significance of the titanium metal industry, the U.S. Bureau of Mines has begun reporting certain salient statistics on the production of titanium metal on a quarterly basis. Some of these statistics had never been published before, while others were published only on a yearly basis. Quarterly reports in this new series will contain data on the production of titanium tetrachloride for use in making titanium metal; production, imports, consumption and prices of titanium sponge metal; consumption of titanium scrap; and production and consumption of titanium ingot.

Sponge metal production in the U.S. was 5,897 s.tons in the first quarter of 1957, compared with 14,595 tons for all 1956. Sponge metal was 4,013 tons; ingot production, 4,536 tons; and ingot consumption, 4,734 tons.

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The Republic Steel Corporation will become the third largest producer of titanium in the U.S., with an annual capacity of 6,000 s.tons, following the completion of the present expansion programme.

Formosa is to produce five tons

monthly of titanium metal, according to the State-owned Taiwan Alkali Corporation. Initially, it is planned to import ores from south-east Asian nations. Later, ore deposits on Formosa will be explored. The metal is to be exported to the U.S. and other allied nations. Part of the cost of the project, estimated at $2,500,000 during the next fiscal year, will be covered by American economic aid.

This announcement comes at a time when the Japanese titanium industry is reported to be facing a crisis, due to postponement or cancellation of some contracts for shipment of sponge to U.S. civilian companies (*vide* our last week's issue, page 114).

### SPANISH QUICKSILVER EXPORTS

The Spanish Trade and Customs Policy Directorate has licensed the following quicksilver exports: 1,045 flasks to the U.S., 400 flasks to the U.K., and 60 flasks to the Netherlands.

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Following a recent reduction in the London ex-warehouse price of quicksilver, the first for nearly a year, has come a further cut—this time by £2 to £87 per flask. Demand is reported to be almost nil, and in the circumstances the availability of certain quantities of Mexican metal at keenly competitive prices is having a depressing effect on the market. Mexican metal for shipment to the U.K. is put at about £84 per flask c.i.f., but there have been hints of even lower prices.

### ZIRCONIUM UNITS FORGED

What are believed to be the first welding fittings of zirconium and Zircaloy 2 have been forged in the U.S. by Tube Turns, a division of National Cylinder Gas Co. Designed for a nuclear energy application, they have an outside diameter of 1.5 in. and a 0.065 in. wall. Designers of piping in the chemical and nuclear fields are said to be specifying these materials in increasing quantities where severe corrosion conditions are encountered.

### MANGANESE IN THE U.S.S.R.

It has been reported that a new iron and manganese ore deposit at Karazhai in the Karaganda district of Kazakhstan is being opened up. The main pit, which is expected to yield up to 2,200,000 tons of ore a year, is nearing completion. Some of the ore will be crushed on site in a plant able to handle 1,200,000 tons of ore a year.

### ENRICHMENT OF GRAPHITE

A process for the enrichment of low-grade graphite to nearly 97 per cent purity has been developed at the College of Engineering and Technology, Jadavpur University, West Bengal. The new process is claimed to have several advantages. Our Far Eastern Correspondent states that, besides enrichment of graphite, it has also been found applicable to the demineralization of coals, beneficiation of pyritic minerals, and dehydration of oil-based pigment.

## COPPER · TIN · LEAD · ZINC

*(From Our London Metal Exchange Correspondent)*

Markets have recommenced to fall, following the short-lived steadiness brought about in the case of copper by the strike in Rhodesia and in the case of lead and zinc by the U.S. announcement of continued stockpiling. There are signs that the holiday season in the U.S. is finishing, but as that in the U.K. and Europe is only just commencing, there is unlikely to be any increase in demand for the next few weeks.

### WEIGHT OF COPPER SUPPLIES

Dealings in the copper market reached a peak of £225 a ton for a very small tonnage of forward metal when it became known that the strike in Rhodesia had become general. As foreshadowed last week, the Rhodesian Government took quick action and the strikers went back to work on Thursday, whilst a court of enquiry goes into not only the immediate rock-breakers' strike, but also into a number of fundamental issues.

Demand for the metal remains good, but some quarters are now expressing doubts as to whether any possible upsurge in off-take during the next few months can, in fact, equal the weight of production at the present level. As an example of the trend in production, it has become known that the Chilean output for the first four months of the year was 9.1 per cent above the corresponding period of last year, and it is also known that production in Rhodesia has risen in spite of recently announced cutbacks. The market itself has been active, with a continuance of the tendency for the contango to widen and stocks in official warehouses this week showed an increase of a further 840 tons.

★

It is understood that the U.K. consumers have now replied to the Copperbelt producers' proposals for a unified pricing basis (see this column June 28). The consumers are believed to be in agreement with the central proposal that the price should be based on the L.M.E. quotation, but have put forward a number of counter-proposals regarding details of procedure. These are now being considered by the producers and it will obviously be some time before anything definite can emerge in the way of an agreement. Nor, we would think, can eventual agreement be as yet taken for granted.

### I.T.C. MEET IN LONDON

The tin market has tended to drift, with consumer demand being rather spasmodic. The International Tin Council met this week in London, and it is expected that no major decisions or policy changes will have been agreed upon. Figures issued by the International Tin Council show that the total world mine production of tin-in-concentrates in May was only slightly below April's figure and that metal production was also almost unaltered.

It is interesting to note that the U.S. tin-plate production in April was an all-time monthly record at 709,487 tons. In London, the backwardation has tended to disappear, with the weekly stock showing an additional 74 tons. On Thursday morning the Eastern price was equivalent to £758¼ per ton c.i.f. Europe.

### STOCKPILING STATEMENT LITTLE HELP TO LEAD AND ZINC

The lead and zinc markets have been a little more active than of late with the price of lead appearing to be less vulnerable than that of zinc. Reports of closing down of mainly zinc properties are still being received, and it is now obvious that the present price level of zinc is sufficiently low to cut out unrequired marginal producers. However, six months will probably have to elapse before it becomes apparent as to whether the remaining producers will be able to meet the total demand.

The announcement in America about stockpiling for the next fiscal year ending June, 1958, which was the cause of a temporary firmness in prices, is an extremely unhelpful document, as in fact it simply means that purchases of lead and zinc may be made for the strategic stockpile, although it has been explained that this does not necessarily mean that purchases will continue for the rest of the year. In fact, the minimum objectives for both metals were met some time ago. It looks as if a limited monthly purchase will be made in order to placate U.S. domestic producers until such time as a policy has been agreed upon for the long-term protection of the industry. The same two metals are also retained in the list of materials which the Agricultural Department may accept in barter with surplus farm products, but here again a spokesman of that department has said that it expects barter deals to slow down.

In general, the outlook for the lead market is one of gradually receding prices without the expectation of any serious drop, whilst in the case of zinc, although today's level will probably prove to be uneconomical, a sudden shortlived fall in price cannot be ruled out. There must, however, be one possibility kept in mind and that is that if the U.S. imposes increased tariffs on the two metals, then under certain circumstances the sterling price as determined by the L.M.E. might be seriously affected in the downward direction.

Closing prices and turnovers:

### THE WEEK ON THE L.M.E.

| | July 25 | | Aug. 1 | |
|---|---|---|---|---|
| | *Buyers* | *Sellers* | *Buyers* | *Sellers* |
| **COPPER** | | | | |
| Cash .. .. | £217 | £217½ | £213 | £213½ |
| Three months.. | £219½ | £220½ | £215½ | £216 |
| Settlement .. | £217½ | | £213½ | |
| Week's turnover | 5,800 tons | | 5,550 tons | |
| **LEAD** | | | | |
| Current ½ month | £92½ | £92½ | £91½ | £91½ |
| Three months .. | £93½ | £93½ | £91½ | £92 |
| Week's turnover | 4,575 tons | | 4,175 tons | |
| **TIN** | | | | |
| Cash .. .. | £749 | £750 | £744 | £745 |
| Three months .. | £746 | £747 | £742½ | £743½ |
| Settlement .. | £750 | | £745 | |
| Week's turnover | 720 tons | | 820 tons | |
| **ZINC** | | | | |
| Current ½ month | £75½ | £75½ | £72½ | £72½ |
| Three months .. | £74½ | £74½ | £72½ | £72½ |
| Week's turnover | 7,625 tons | | 5,700 tons | |

**London Metal and Ore Prices appear on page 144.**

*Mining Finance*

# Hold On To Lonrho

Last week, Messrs. Glazer Bros., of Johannesburg, made a bid for the shares of London and Rhodesian Mining and Land at 13s. 3d. per 5s. stock unit. Previous to the announcement the share value had fluctuated this year between 6s. 6d. to 10s. 9d., and thus the bid, pitched as it was 2s. 6d. higher than the peak price for the year, was not, on the face of it, unattractive. Perhaps, too, it can be mentioned that on the figures shown in the company's accounts relating to the year ended June 30, 1956, the company's assets represented 8s. per 5s. share. But this took no account of the potential value of its town stands and buildings, which ought to be worth much more than the figure of £102,181 shown in the balance sheet.

Yesterday, the Board of London and Rhodesian replied to Mr. Glazer's bid, and made the point that the asset value of the company's shares is well in excess of the bid price of 13s. 3d. In fact, the Board reckons that the value of the net assets today, without allowing for future appreciation, is in excess of £3,000,000, or a minimum of 15s. each for the 4,000,000 stock units in issue. Moreover, the Lonrho Board hold the view that the potential profit-earning capacity of the company is such that increasing profits and dividends may be anticipated in the not far distant future. Indeed, it is expected that because of the intensive development programme of the company's ranches, profits from this source may well increase from the current figure of £62,696 per annum to something over £200,000 by 1966. An increase in the profit-earning capacity of this magnitude would raise earnings before tax from the present figure of £146,000 to £270,000 per annum.

Moreover, when the Finance Bill becomes law, it should be possible to hive-off certain of the company's activities with a view to their qualifying for O.T.C. status. This no doubt applies to Cam and Motor, the largest Rhodesian gold mine, and to Coronation Syndicate, which owns three gold producers, namely, Muriel, Arcturus and Tebekwe.

These are reasons enough why shareholders should reject the offer by Glazer Bros., but if perchance more support for this view is needed, then the point is also made that the Board of London and Rhodesian and certain associated companies who already hold a substantial portion of the equity, have no intention of selling at the bid price. And, indeed, Lonrho has been advised that certain of its associates are continuing their policy of buying the company's stock at current market prices.

To view the matter from the other side of the fence, it ought to be made clear that Messrs. Glazer Bros.' bid is hedged around with "ifs" and "buts". For example, it is conditional on 51 per cent acceptance, but Messrs. Glazer Bros. reserve the right to accept a lesser or greater percentage. Secondly, the offer is open until August 15, but the right is reserved to extend it to September 10 provided notice is given by August 15.

Finally, Messrs. Glazer Bros. give no indication as to what their future policy would be in the event of gaining control. But as Glazer Bros. acquired a similar business, Bechuanaland Exploration, some years ago, it would seem fair comment that interest lies with Lonrho's extensive agricultural holdings, which cover 906,520 acres.

No summing up is necessary, the simple straightforward conclusion obviously being to reject the present bid.

## HENDERSON'S GROWTH OUTLOOK

Henderson's Transvaal Estates was unlikely to be eligible for Overseas Trade Corporation status under the recent U.K. budget tax concession, said Sir Joseph Ball at the company's annual meeting earlier this week. Yet it was possible that its wholly owned and U.K.-registered subsidiary, Mineral Holdings, might qualify for O.T.C. status.

Added importance is given to the possibility of Mineral Holdings qualifying as an O.T.C., as Henderson's mineral rights and concessions are held by this company. Properties are held in various parts of the Transvaal, and the chairman said that Union Corporation had exercised its option over Farm Zandfontein in the new far eastern Rand gold fields. The price paid was £22 a morgen, and the area extended over 2,139 morgen. Mineral Holdings will be entitled to an interest in any company formed to exploit the area.

With regard to Mineral Holdings concessions in Swaziland over areas amounting to 752,799 acres, Sir Joseph informed that Johannesburg Consolidated has undertaken to prospect these properties on satisfactory terms. Incidentally, Mineral Holdings has also prospecting option agreements in the Bethal area with companies associated with two of the leading mining finance houses. In fact, the Winkelhaak mining lease area lies close to Mineral Holdings land. Although none of its areas are included in the Winkelhaak property, drilling is still continuing in the area, and it is possible that the company will benefit from the eventual establishment of any additional gold mines in the area. Mineral Holdings also has Farm Vryheid 779 extending over some 9,000 acres adjoining the Messina-Transvaal Development Company. Exploratory work is being carried out by Messina in an area immediately adjacent to and west of Vryheid. No reports from this work are as yet available, but this, too, could be an asset of considerable potential value to the company.

## LONDON MARKET HIGHLIGHTS

Although the Kaffir market again failed to develop a decided trend in the week ended July 31, there were several features worthy of note. Among them, Riebeeck, 1s. 4½d. up at 11s. 9d., were outstanding on Cape buying on the belief that the haulages being driven into the property from the neighbouring Loraine were reaching the common boundary of the two mines. It was considered that some reef development on the Rainbow series may thus be possible during the current quarter. Also good on Cape support were Free State Saaiplaas (2s. up at 12s. 9d.); as in the case of Riebeeck, little stock was found to be available and in the absence of any obvious reason for the buying, some "shop" support was suspected. Vaal Reefs (33s. 9d.) remained firm on their good profit-earning prospects and Blyvoor (21s.) continue to improve on the Western Deep flotation news. The underground fire at Free State Geduld (now under control) had only a momentary effect on the shares. Elsewhere, Stilfontein (32s. 6d.) became a good market on the view that recent underground development on the property has been even more encouraging than the results so far published indicate.

Otherwise, Finance House shares fluctuated narrowly with a certain amount of profit-taking noticed in Johnnies, now 53s. 3d. Diamonds were little changed, but weakness developed in Platinum following the reduction in Baker Platinum's selling price for the metal. Potgeitersrust (14s. 6d.) and Waterval (22s. 6d.) came back sharply, even though their production is marketed through Johnson, Matthey, whose price has so far not followed the Baker reduction.

Among Rhodesian Land shares, London and Rhodesian have been a firm market at around 12s.; opinions that the shares have an asset value in excess of the Glazer Bros.' 13s. 3d. bid being confirmed by the L. and R. board's latest circular. It has also been interesting to note that a demand has begun to be seen for Rhodesian Corporation (4s. 6d.) in the light of the L. and R. "real" asset value disclosure. It is suspected that "Rho-Corps" could be well undervalued on the theory that their balance-sheet figure for property assets must be more than conservative in view of the rising land values in Rhodesia.

Lead-zincs have been well maintained in spite of the rather dreary course of the metal prices. Consolidated Zinc (76s.) having been particularly strong on a steady demand. Tin shares have shown little noteworthy alteration and there has been little doing in West African Golds apart from a rise in Konongo to 1s. 7½d. following the surprise interim dividend.

Copper shares tended to be depressed at times by the falling metal price and the Copperbelt labour troubles. Now that the strike has terminated and the metal has eased to almost its lowest since the resumption of free dealings in August, 1953, share prices have again wilted.

## FINANCIAL NEWS AND RESULTS IN BRIEF

**Central Mining Free State Areas to Liquidate.**—At the annual meeting, to be held some time in November, shareholders are to be asked to approve a resolution placing the company in voluntary liquidation. The directors envisage that the liquidation distribution will consist both of cash and of Harmony shares. At June 30, 1956, the company's holding of Harmony was 1,800,000 shares, equivalent to three Harmony for every two Central Mining Free State, and current assets worked out at 3½d. per share. In addition, there were further investments making a total (at market or directors' valuation) of £2,603,257.

**Drooping Metal Prices Hit Capper Pass.**—Although Capper Pass and Son have maintained last year's total of 8 per cent with a second interim of 3 per cent, group profits before tax and depreciation slipped to £426,066 in the year to March 31, against £692,797 last year. Included in this figure is a loss on falling metal prices—last year a profit was derived from this source. Taxation this year absorbed £191,865, a drop of £120,000, and depreciation was slightly lower at £113,358. Net transfers to reserves totalled £45,000 against £190,000, dividends amounted to £73,917, and the balance was halved at £120,843. £310,667 is carried forward.

**Naraguta Preliminaries.**—Preliminary figures for two Naraguta tin companies show widely differing results. Naraguta Karama turned a 1956 loss of £1,971 into a profit of £868 and declared a dividend of 2½ per cent (nil last year) but the parent, Naraguta Tin, turned a profit of £22,128 into a loss of £34,714 in spite of marginally higher production, and again recommends no dividend. At the end of the latter company's annual meeting, to be held in London on August 20, an E.G.M. will be held to consider a resolution placing the company in voluntary liquidation.

**The Continental.**—Continental Mining and Exploration, who are interested in (*inter alia*) Faraday Uranium, Bateman Bay, Galkeno, and El Sol, are actively searching for mineral deposits all over Canada, said the chairman, Mr. A. W. Johnston, at the annual meeting on July 10. 56 groups are held in six provinces or territories, totalling 1,704 claims, of which 46 per cent are currently being investigated. In the first six months of this year, 197,000 ft. were drilled under Continental's supervision, against 151,000 ft. in the first half of last year.

**British Anthracite Company Pays More.**—B.A.C.'s net profit in 1956 improved to £655,180 from the preceding year's £716,611, according to preliminary figures released last week. Amalgamated Anthracite, the holding company, showed similarly improved figures, group net profit being £215,674 against £195,165 in 1955. The dividend recommended moves up from 8 per cent last year to 10 per cent this year, absorbing £43,780.

**There's Nothing Like a Balance at the Bank.**—In spite of a substantial decrease in profits after tax in the year to March 31, 1957, the directors of Climax Rock Drills have found themselves able to recommend an unchanged dividend of 7½ per cent "in view of the company's cash position". The 1957 profit figure was £37,272 (1956, £49,928) and £25,000 was transferred to General Reserve. Meeting, London, September 25. Chairman, Mr. Ralph Ewing.

**Western Mining Offer.**—Western Mining Corporation of Australia have bid for the whole of Gold Mines of Australia's issued capital not already held by them on an exchange basis of two Western for five G.M.A. Acceptance of the offer is recommended by Gold Mines directors. The exchange is conditional on 90 per cent acceptance of the offer, which expires on August 19.

**Paringa and Uranium.**—Paringa Mining and Exploration announce that they have acquired a testing option on uranium leases in Queensland. This is the only significant secondary ore deposit so far proven in the Cloncurry mineral field. Paringa's geologists have commenced investigations on this and other properties.

**Asian 'Flu on the Rand.**—It is reported that over 3,700 new cases of Asian 'Flu have been admitted to hospital from mine compounds on the Rand and in the O.F.S. At Freddies Consolidated alone more than 65 Africans are in hospital.

**O.F.S. Mishaps.**—A fire which broke out in the upper levels of Free State Geduld early this week was extinguished, it is believed, with only a negligible effect on production. At St. Helena, a fall of rock in the No. 2 Shaft killed two Africans.

**Gold Fields' Portmanteau Issue.**—Rights acceptances of Consolidated Gold Fields' combined units totalled 95 per cent, reports the company. The remaining 49,703 units were applied for 13 times over.

**Kay Tin.**—The report and accounts of Kay Tin Mines (Kinta) show a loss of £2,136 in 1956 against £1,290 in 1955. The meeting is being held in London to-day, Mr. A. C. Bolton, the chairman, presiding.

**Aluminium Ltd.**—Aluminium Ltd. announce a quarterly dividend of 22½ c., payable September 5. This compares with the June quarterly of 67½ c., made before the three-for-one stock split.

## GOLD & BASE METAL MINES OF NIGERIA

### OUTPUT STILL INCREASING

The twenty-third annual general meeting of Gold & Base Metal Mines of Nigeria, Ltd., was held on July 29 at the Chartered Insurance Institute, London, E.C.

**Major-General W. W. Richards, C.B., C.B.E., M.C.,** Chairman, presided.

The following is an extract from his Statement circulated with the Report and Accounts for the year ended December 31, 1956 :—

Although gross revenue arising from the sale of our mineral production did not reach the record figure of 1955, part of the decline is due to the fact that we have now adopted a different basis of accounting, whereby stocks on hand at the year end are included at cost and not at prices subsequently realized. In addition, only a proportion of our Columbite production was sold at the premium price of approximately £2,000 per ton.

The most satisfactory feature of the Balance Sheet is the major reduction in our current liabilities which have been so heavy of recent years, so that there is now, excluding Stores on Hand, a small excess of current assets over current liabilities. One aspect of this situation is the disappearance of the bank overdraft. The Directors have recommended a payment of a dividend of 7½% for the year under review.

#### Tin

Output at 773 long tons of Tin concentrates shows a satisfactory increase over the previous year's figure of 582 tons which in turn compared with 510 tons for 1954. This advance continues into the current year as evidenced by the production totals for the first five months, which were 399 tons against 255 tons for the comparative period of 1956.

Shortly before the close of the year, we were required to make our initial contribution to the Buffer Stock which was created under the International Tin Agreement. This contribution was made in cash totalling £27,309 and was financed by a loan from the Government of the Federation of Nigeria, carrying interest at 4% per annum. Repayment is not required until the Agreement comes to an end and the Buffer Stock is liquidated. There is a commitment to make a further contribution to the Buffer Stock, of 28.45 tons in metal or cash when called upon to do so, and this will be financed in the same manner.

#### Columbite

Our output of 178 short tons was all sold under contract at an average price of £1,650 per ton. The market is, at present, somewhat narrow and business is limited. This has rendered desirable a certain redeployment of plant and a change in policy as to the areas to be worked, dependent on their tin/columbite content ratio. This accounts for the reduced columbite output for the current financial year and this policy will be pursued until the anticipated expansion in demand takes place.

#### Taxation

In the provisions of the Finance Bill 1957, as at present drafted, it would appear that this Company will qualify as an Overseas Trading Corporation.

Owing to the temporary advantages which the Company is at present obtaining by way of tax allowances on capital expenditure incurred in recent years, no immediate material benefit is likely to be obtained but future benefit will depend on the rates of income tax in Nigeria and the amount of dividends distributed to shareholders.

As regards the current year, as I have shown, output continues to increase and this should help considerably to offset any decline in revenue from sale of Columbite at the present price levels.

The report and accounts were adopted.

## KINTA TIN MINES

The 56th Annual General Meeting of Kinta Tin Mines Ltd., was held on July 25, in London.

**Mr. A. G. Glenister, C.B.E.,** Chairman presiding stated that the profit for 1956, after charging £99,442 taxation, was £56,166. Shareholders had received dividends amounting to 4s. per share, less income tax, and a Capital Repayment of 3s. per 5s. share, free of income tax. The authorized Share Capital of the Company remains at £120,000 but the issued Share Capital has been reduced by the capital distribution to £48,000 divided into 480,000 shares of 2s. each. A bid for the whole of the Issued Capital last October was rejected by an overwhelming majority thanks to the solid support given to the Board by shareholders. The output was 502 tons of tin ore from £1,094,000 cu. yds. representing a recovery of 1.03 lb. per cu. yd. and working costs were 22.53 pence per cu. yd. Operations continued at the Damak Section and exceptionally good returns were obtained from high grade ground. The output for the first 6 months of the current year is 361 tons.

Mr. Glenister referred to the coming political changes in Malaya and the reassuring statements made by the Chief Minister and other Ministers. Repeated assurances had been given that British Capital for mining will be welcomed and that British Companies operating in Malaya need have no fear of discriminatory legislation or policy. Mr. Glenister ended "It is in the expectation of this spirit of goodwill, of co-operation for mutual benefit and of assurance of fair treatment that the Company look forward to the future".

## TANJONG TIN

The 31st Annual General Meeting of Tanjong Tin Dredging Ltd., was held on July 25 in London.

**Mr. A. G. Glenister, C.B.E.,** Chairman presiding stated that the profit for 1956, after charging £276,500 taxation, was £167,627. Shareholders received 5 interim dividends amounting to 7s. 6d. per share, less income tax, and two Special Capital Dividends, free of income tax, amounting to 8s. per 5s. share. In October 1956 a bid for the whole of the Issued Capital was rejected by an overwhelming majority, thanks to the solid support given to the Board by shareholders. The output was 1,327 tons of tin-ore from 4,345,900 cubic yards, representing a recovery of 0.68 lb. per cu. yd. and working costs were 10.19 pence per cu. yd. The output for the first 6 months of the current year is 685½ tons.

No. 2 Dredge again obtained excellent results but will shortly be entering ground of not such high value and some reduction in output from this unit is anticipated. No. 1 Dredge is now entering an area, the whole of which has been dredged before. Recoveries from previously dredged ground are difficult to estimate and should they prove too low No. 1 Dredge may close down shortly and the ground be left for working by No. 2 Dredge, a larger, deeper digging and more economical unit to operate. This would not affect the estimate of the probable life of the mine given to shareholders last year. Mr. Glenister ended by referring to the coming political changes in Malaya and the reassuring statement made by the Chief Minister and other high officials regarding British Capital invested in Malaya.

## HENDERSON'S TRANSVAAL ESTATES

### SIR JOSEPH BALL'S REVIEW

The 45th annual general meeting of Henderson's Transvaal Estates, Limited was held on July 30 in London.

**Sir Joseph Ball, K.B.E.** (the Chairman) presided and, in the course of his speech, said: The profit of the Company for the year, before taxation, amounted to £68,331. From this sum has to be deducted £24,693 for taxation, leaving a net profit of £43,638, to which must be added £71,988 brought forward, making an available total of £115,626. Your Directors recommend a dividend of 15%, less tax, leaving £64,731 to be carried forward.

The consolidated profit before taxation, at £269,775 was approximately £50,000 higher than in the previous year, and the net profit amounted to £127,983 compared with £103,447.

After reviewing the satisfactory results of Tweefontein United Collieries Limited, a subsidiary company, the Chairman said: Drilling operations on a block of farms approximately 8,500 morgen in extent in the Witbank/Middleburg area have established the fact that the area is underlain by very large tonnages of coal of satisfactory quality.

Reviewing the affairs of Mineral Holdings Limited, the Chairman said that Union Corporation had recently exercised its option over the farm Zandfontein—a farm of 2,139 morgen, and the purchase price of the mineral rights had been agreed at £22 per morgen.

The report was adopted.

## BREMANG GOLD DREDGING

### LARGER PROFIT

The twentieth annual general meeting of Bremang Gold Dredging Co. Ltd., was held on July 29 in London.

**Major-General W. W. Richards, C.B., C.B.E., M.C.,** Chairman, presided.

The following is an extract from his Statement circulated with the Report and Accounts for the year ended December 31, 1956:—

Revenue from gold recovered aggregated £538,886, an increase of £45,495 compared with the previous year.

Mine operating expenditure at £397,570 showed an increase of approximately £33,000. The profit earned was £74,590, higher by £11,181 on the previous year.

Due to the heavy commitments of expenditure on dredge transfer, the cash position has to be conserved, and the Directors must again restrict the year's dividend payment to 5% less tax, the same as last year.

The results for the period January/May 1957 showed that an aggregate of 2,999,600 cubic yards were treated for an output of 14,966 ounces of gold and an operating profit of £40,324. The last two months profit figures were below the average, and this is due to the fact that the dredges were temporarily operating in low grade and difficult dredging ground. It will be readily appreciated that dredging operations have to follow the course of the river, and it is impracticable to carry out selective dredging. Results therefore are not comparable month by month, but should be judged over a period.

The report and accounts were adopted.

## THE STANDARD BANK OF SOUTH AFRICA, LIMITED

### PERIOD OF CONSOLIDATION

The 144th Ordinary Meeting (being the Annual General Meeting for the year 1957) of the Bank was held on July 31 in London, **Sir Edmund Hall-Patch, G.C.M.G.** (the Chairman) presiding.

The following is an extract from his circulated statement:

The Balance Sheet figures reflect a record total of £366 million, an increase on last year of nearly £27 million.

After the usual and necessary provisions, the profit for the year is £815,669, a decrease of £7,690. A final dividend of 1s. 6d. per share is recommended, making a total distribution of 2s. 6d. per share, the same rate as paid last year.

The over-all results of our operations during the past year have not been quite so favourable as those of the previous year. The period under review has, generally speaking, been one of consolidation following on a phase of rapid expansion. Money continued to be tight and demands for extended credit continued to increase. Official policy has been one of cautious restriction of credit, yet, while respecting the wishes of the authorities, it has nevertheless been possible to meet the legitimate banking requirements of the bulk of our customers.

The pattern of the Union's economic development during 1956 ran true to the trend of forecasts made at the beginning of the year. Briefly, expansion continued, but the general rate of progress had not the impetus of earlier years. The slower tempo of development is not without virtue at present but, if fresh injections of capital do not follow once the dangers of inflation are past, the present phase of consolidation may be unduly prolonged, to the detriment of natural development. South Africa is fortunate in having great natural resources but these can only be developed by heavy capital investments. There is, however, a world-wide shortage of capital and what is available will naturally tend to flow to those areas where political and social conditions seem to offer the greatest promise of continued stability. To provide this climate, in competition with other countries seeking capital for development, is the problem which faces the statesmen and industrialists of the Union—and indeed the whole of Africa.

Federation of Rhodesia and Nyasaland: Capital continues to be attracted to the Federation and such flow of funds has probably been stimulated by the decision of the International Bank for Reconstruction and Development to assist in the financing of the Kariba Hydro-Electric Project: the vastness of the scheme in itself attracted considerable publicity and drew attention to the possibilities for investment and development which exist in the Federation. Nevertheless the capital inflow is still inadequate to meet the needs of the rapidly expanding economy of the Federation.

East Africa: The development of East African territories will call for the import of capital on a very large scale. Under the integrated plan which is being prepared, some £250 million is estimated to be needed over the next ten years or so and the prospects not only of economic but of social and political advance will depend vitally on the extent to which this plan can be realized.

The report and accounts were adopted.

## Conferences and Exhibitions

The Iron and Steel Institute is holding a special meeting in Belgium and Luxembourg from June 18 to 28, 1958. In honour of the Institute's visit, the Centre National de Récherches Métallurgiques, the Groupement des Industries Sidérurgiques Luxembourgeoises, and the Groupement des Hauts Fourneaux et Aciéries Belges are organizing an international iron and steel meeting on the general theme of "New Developments in Iron and Steel Making".

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From applications for space so far received, it is already evident that at the 1958 Gauge and Tool Exhibition to be held at Olympia in May next year, the stand area will be over four times as great as in previous exhibitions. Machines will be in operation on many stands for the purpose of demonstrating the uses of tools and gauges.

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New and revised schemes for the session 1957-58 have been announced by the City and Guilds of London Institute, Gresham College, Basinghall Street, London, E.C.2.

AERIAL ROPEWAY.—Part dismantled, comprising steelwork and fittings from 33 towers; loading and driving; holding down and angle stations. Seen by appointment. Apply: The Cementation Co. Ltd., Civil Engineering Department in Scotland, 17 India Street, Glasgow, C.2. (Tel.: Glasgow City 3838.)

## LONDON METAL AND ORE PRICES, AUGUST 1, 1957

### METAL PRICES

Aluminium, 99.5%, £197 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 12s. 0d. lb.
Cerium (99% nett), £13 18s. lb. delivered U.K.
Chromium, Cr. 99%, 7s. 2d. lb.
Cobalt, 16s.-19s. lb.
Germanium, 99.99%, Ge. kilo lots 3s. 4d. per gram
Gold, 251s. 5½d.
Iridium, £27/29 oz. nom.
Lanthanum (9½/99%) 15s. per gram
Manganese Metal (96%-98%) £310
Magnesium, 2s. 5½d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £20/22 oz. nom.
Osmiridium, nom.
Palladium, £7 10s./£8 0s. oz.
Platinum U.K. and Empire Refined £34 oz.
Imported £29 0s./£30 0s. nom.
Quicksilver, £87 ex-warehouse
Rhodium, £42 oz.
Ruthenium, £15/£17 oz. nom.
Selenium, 75s. nom. per lb.
Silver, 78¼d. f. oz. spot and 78d. f'd.
Tellurium, 15s. 16s. lb.

### ORES AND OXIDES

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| Bismuth | 30% 5s. 0d. lb. c.i.f. |
| | 18/20% 1s. 3d. lb. c.i.f. |
| Chrome Ore— | |
| Rhodesian Metallurgical (semifriable) 48% | £19 5s. 0d. per ton c.i.f. |
| ,, Hard Lumpy (45%) | £19 5s. 0d. per ton c.i.f. |
| ,, Refractory 40% | £13 0s. 0d. per ton c.i.f. |
| ,, Smalls 44% | £18 0s. 0d. per ton c.i.f. |
| Baluchistan 48% | £12 0s. 0d. per ton f.o.b. |
| Columbite, 65% combined oxides, high grade | 185s./197s. 6d. per unit |
| Fluorspar— | |
| Acid Grade, Flotated Material | £22 13s. 3d. per ton ex. works |
| Metallurgical (75/80% $CaF_2$) | 156s. 0d. ex works |
| Lithium Ore— | |
| Petalite min. 3½% $Li_2O$ | 47s. 6d./52s. 6d per unit f.o.b. Beira |
| Lepidolite min. 3½% $Li_2O$ | 47s. 6d./52s. 6d. per unit f.o.b. Beira |
| Amblygonite basis 7% $Li_2O$ | £26 5s. per ton f.o.b. Beira |
| Magnesite, ground calcined | £28 0s./£30 0s. d/d |
| Magnesite Raw (ground) | £21 0s./£22 0s. d/d |
| Molybdenite (85% basis) | 8s. 5d. nom. per lb. (f.o.b.) |
| Titanium Ore— | |
| Rutile 95/97% $TiO_2$ (prompt delivery) | £54/£55 per ton c.i.f. Aust'n |
| Ilmenite 52/54% $TiO_2$ | £11 10s. per ton c.i.f. Malayan |
| Wolfram and Scheelite (65%) | 110s. 6d./117s. 6d. per unit c.i.f. |
| Manganese Ore Indian | |
| Europe (46%-48%) basis 130s. freight plus 5% surcharge | 131d./133d. per unit c.i.f. |
| Manganese Ore (43%-45%) | 106d./108d. per unit c.i.f. |
| Manganese Ore (38%-40%) | 100d./102d. per unit (including duty) |
| Vanadium— | |
| Fused oxide 90-95% $V_2O_5$) | £12½-£13½ per unit c.i.f. |
| Zircon Sand (Australian) (65-66% $ZrO_2$) | £19 per ton c.i.f. |